Cooke Hydroelectric Plant, Spillway
Cooke Dam Road at the Au Sable River
Oscoda Vicinity
Iosco County
Michigan

HAER No. MI-98-B

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PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
National Park Service
Mid-Atlantic Regional Office
Department of the Interior
143 South Third Street
Philadelphia, PA 19106

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HISTORIC AMERICAN ENGINEERING RECORD

COOKE HYDROELECTRIC PLANT, Spillway

HAER No. MI-98-B

Location: Cooke Dam Road at the Au Sable River
Oscoda Vicinity
Iosco County, Michigan

UTM: 17:295410:4927370
Quad: Sid Town, Mich., 1:24,000

Dates of Construction: 1910-1911

Engineer: William G. Fargo, Fargo Engineering, Jackson, Michigan

Present Owner: Consumers Power Company
212 West Michigan Avenue, Jackson, Michigan 49201

Present Use: Spillway for hydroelectric generating plant

Significance: The Spillway at the Cooke Hydroelectric Plant was designed by William G. Fargo, a Jackson, Michigan, engineer who specialized in building small to medium-sized hydropower plants in the Midwest. The Spillway is used during floods to prevent the pond from overtopping the dam.

Project Information: This documentation was prepared by Consumers Power Company (CPCo) in conformance with its Cultural Resources Management Plan for the Au Sable River Hydroelectric Projects (July 1995). The plan stipulated the recordation of the entire Cooke Hydroelectric Plant (according to the standards of the Historic American Engineering Record) as mitigation for the planned rehabilitation of the plant's concrete spillway. The documentation was completed in 1996 by Hess, Roise and Company of Minneapolis under contract with CPCo. Jeffrey A. Hess served as Principal Investigator and Cynthia de Miranda as Project Historian. Project photography was completed under a subcontract with Hess Roise by Clayton B. Fraser of Loveland, Colorado.

PHYSICAL DESCRIPTION

The Cooke Hydroelectric Plant's 92'-wide controlled Spillway sits near the center of the complex, connecting the Powerhouse (HAER No. MI-98-C) on the south with the North Embankment (HAER No. MI-98-A), on the north.[1] The Spillway consists of three steel Tainter gates set into 4'-0"-thick, 40'-0"-high reinforced concrete piers. Each gate rests on an intermediate pier that rises 24'-0" above the Spillway's poured concrete foundation. Concrete splash walls slope downward from the northernmost and southernmost piers to protect the North Embankment and the Powerhouse, respectively, from any water that is being spilled. A 6'-11"-wide, non-functioning log chute, its gate now plugged with concrete, is situated between the southern splash wall and the north wall of the Powerhouse.

The Tainter gates are each 24'-0" wide and 14'-6" high with a wedge-shaped profile. They are composed of riveted structural steel members. The upstream face of each Tainter gate is a convex, laterally-braced steel panel capable of holding back 12'-6" of water. Two 14'-0" radial arms connect the convex panel to steel pivots imbedded in the adjacent pier walls, giving the gates their distinctive profile. The Tainter gates are raised by motorized chain hoists mounted on a concrete walkway that rests on the piers and spans the width of the spillway. The chains lift the panel, causing the gate to rotate around the steel pivots in the piers. When the gates are raised, flood waters pass beneath the steel panels into a concrete-lined tumble bay below.

Extending approximately 70' downstream, the tumble bay ends in a 12'-0"-high baffle wall designed to slow the velocity of the spilled water. Beyond the wall, a concrete apron covers another 150'-0" of the riverbed. The normal tailwater elevation submerges the apron downstream (east) of the baffle wall.[2]

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[1] While the Powerhouse is more accurately southeast of the spillway, this description is written to reflect approximate full cardinal points for the sake of clarity.

[2] This description is based on a site survey completed by the authors on 27 July 1995 and on "Highest-Voltage Transmission System in the World, Part I," *Electrical World* 59 (13 April 1912): 795-798 and "Highest-Voltage Transmission System in the World, Part II," *Electrical World* 59 (20 April 1912): 843-846

HISTORY

Like the rest of the structures at the Cooke Hydroelectric Plant, the Spillway was designed by William G. Fargo. A civil engineer based in Jackson, Michigan, Fargo had been building low-head hydroelectric plants in the Midwest for fifteen years and had already completed projects for William Augustine Foote, the "utilities man" chiefly responsible for the Cooke development. Fargo designed the Spillway at Cooke to pass flood waters that might threaten to overtop the dam. The Au Sable River's remarkably uniform flow did not warrant a Spillway as large as that of the 1908 Croton Hydroelectric Plant on the Muskegon River, the facility perhaps most in mind during the design phase of this plant.[3]

The concrete work on the Spillway was completed in conjunction with the Powerhouse foundation (HAER No. MI-98-C). The Spillway piers and tumble bay were in place by the end of October 1910.[4] The river channel was then diverted through the piers to allow completion of the embankment across the original channel. This diversion was made possible by the use of temporary sluice gates installed at the base of the Tainter gate piers for the sole purpose of accommodating the river's flow during construction.[5]

The Spillway retains its original function, although its appearance has been slightly altered. When first installed, the Tainter gates measured only 13'-0" in height. An extra 1'-6"-high panel was affixed to the tops of the original panels in 1925, when the corewalls and the North and South Embankments (HAER Nos. MI-98-A and MI-98-E) were raised to accommodate an increase in the height of the impoundment headwater elevation. The original Spillway configuration also included a 6'-11"-wide log chute on the south end and a 4'-8"-wide fish ladder on the north end, both situated outside the splash walls . Sometime after 1925, the log chute was dammed up and the fish ladder removed.[6]

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[3] See Charles K. Hyde,"Croton Hydroelectric Plant, Spillway," HAER No. MI-81-C, 1994, Historic American Building Survey/Historic American Engineering Record Collection, Library of Congress, Washington, D.C.

[4] Cooke Hydroelectric Plant construction and overview photographs, Hydro Operations, Consumers Power Company, Cadillac, Michigan.

[5] "Water Power from the Au Sable River," *Engineering Record* 66 (31 August 1912): 247.

[6] Commonwealth Power Corporation for Consumers Power Company, "Cooke Dam—Raise Head, Corewall, Etc., 1925," Drawing M28-F1005, Corporate Archives, Consumers Power Company, Bridge Street, Jackson, Michigan.

SOURCES OF INFORMATION

ENGINEERING DRAWING

Commonwealth Power Corporation for Consumers Power Company, "Cooke Dam—Raise Head, Corewall, Etc., 1925" Drawing M28-F1005. Corporate Archives, Consumers Power Company, Bridge Street, Jackson, Michigan.

HISTORIC VIEWS

Cooke Hydroelectric Plant construction and overview photographs. Hydro Operations, Consumers Power Company, Cadillac, Michigan.

MANUSCRIPT SOURCE

Hyde, Charles K. "Croton Hydroelectric Plant, Spillway." HAER No. MI-81-C, 1994. Historic American Building Survey/Historic American Engineering Record Collection, Library of Congress, Washington, D.C.

PUBLISHED SOURCES

"The Design and Methods Employed in Constructing the Cooke Water Power Plant on the Au Sable River in Michigan." *Engineering and Contracting* 37 (5 June 1912): 639-644.

"Highest-Voltage Transmission System in the World, Part I." *Electrical World* 59 (13 April 1912): 795-798.

"Highest-Voltage Transmission System in the World, Part II." *Electrical World* 59 (20 April 1912): 843-846.

"Water Power from the Au Sable River." *Engineering Record* 66 (31 August 1912): 246-248.